CLAIMS

1. An integral primary and secondary heat exchanger of the cross flow type having a regularly spaced, parallel series of flow tubes with distinct fluids flowing through the primary and secondary tubes, and a common external fluid flowing over the exterior surface of all tubes, each primary and secondary tube having adjacent internal flow passages with a respective, pre determined internal web thickness between adjacent passages and a pre determined optimal internal passage flow height measured in the direction perpendicular to the flow of the common exterior fluid that is determined by the flow characteristics of its respective internal fluid, each tube also having a respective pre determined minimum perimeter wall thickness, and in which the secondary tube has a pre determined overall tube thickness, measured perpendicular to the flow direction of the external fluid, that is determined by its optimal internal passage flow height and minimum perimeter wall thickness, and in which the optimal internal passage flow height of the primary tube is substantially less than that of the secondary tube, but in which it is desired to maintain the overall tube thickness of all tubes substantially equal,

characterized in that said primary tube includes a series of flow passages extending around and inboard of the perimeter thereof, each of which is spaced from the perimeter of the tube by its respective minimum perimeter wall thickness and is also spaced from each adjacent flow passage by at least said pre determined web thickness, so as to create an efficiently packaged array of flow passages within said primary tube, while maintaining the constant overall tube thickness across all tubes.

2. An integral heat exchanger according to claim 1 in which the secondary flow tubes are oil cooler tubes and the primary flow tubes are refrigerant condenser tubes.

3. A heat exchanger according to claim 2, in which the internal flow passage height of the condenser tube is less than half that of the oil cooler tube, whereby the condenser tube is arrayed with a double row of flow passages about the tube perimeter.

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4. A heat exchanger according to claim 3, in which said condenser tubes are arranged in a single pass flow pattern between the manifold tanks.